Measuring Behavioral Responses of Spawning Chum Salmon to Elevated River Flows, 2005

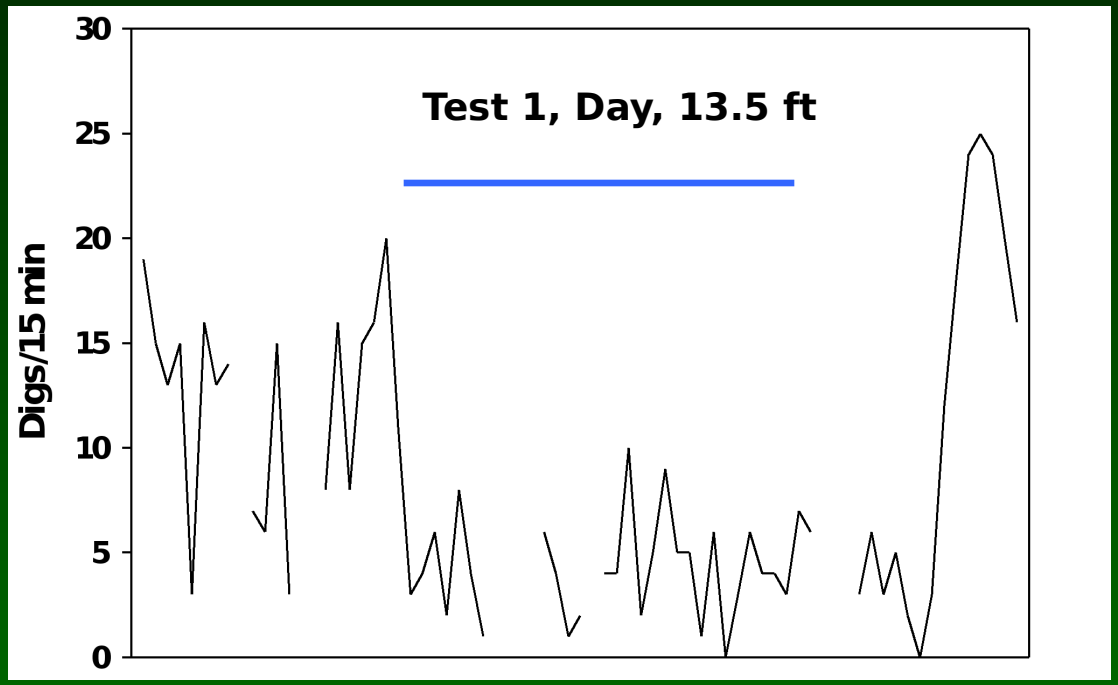
Kenneth Tiffan
U.S. Geological Survey
Western Fisheries Research Center
Cook, Washington

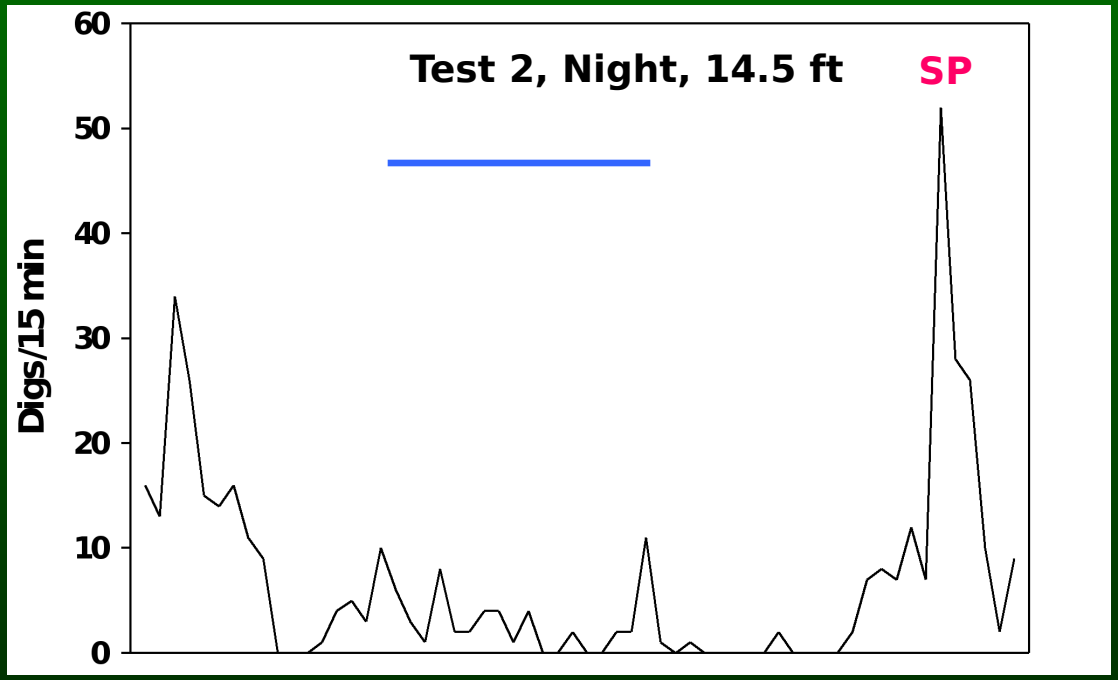
USGS

Summary of Test flows in 2005

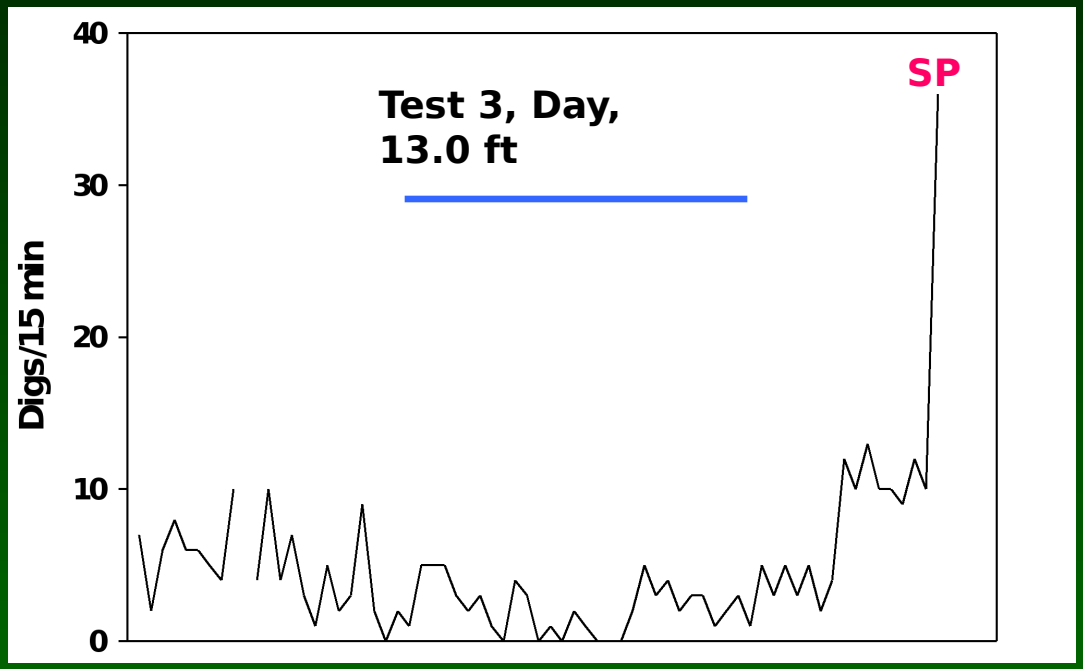
Test	Date	Type	Requested elevation	Actual elevation
1	11/16	Day	13.5	13.5
2	11/17	Night	15.5	14.5
3	11/19	Day	13.5	13.0
4	11/21	Night	13.5	13.5
5	11/22	Cancelled		
6	11/26	Day	15.5	15.5
7	12/1	Night	13.5	12.7
8	12/2	Night	15.5	15.5
9	12/6	Night	15.5	15.5
10	12/8	Night	13.5	13.5

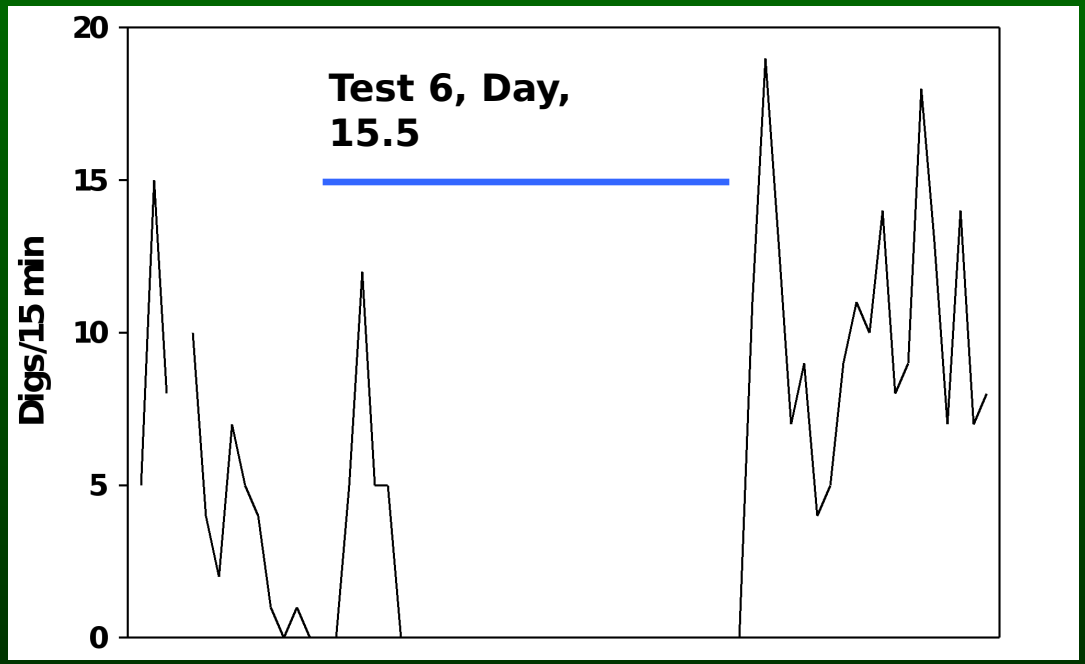
USGS


Test 1, Day, 13.5 ft
Digs/15 min
30
25
20
15
10
5
0

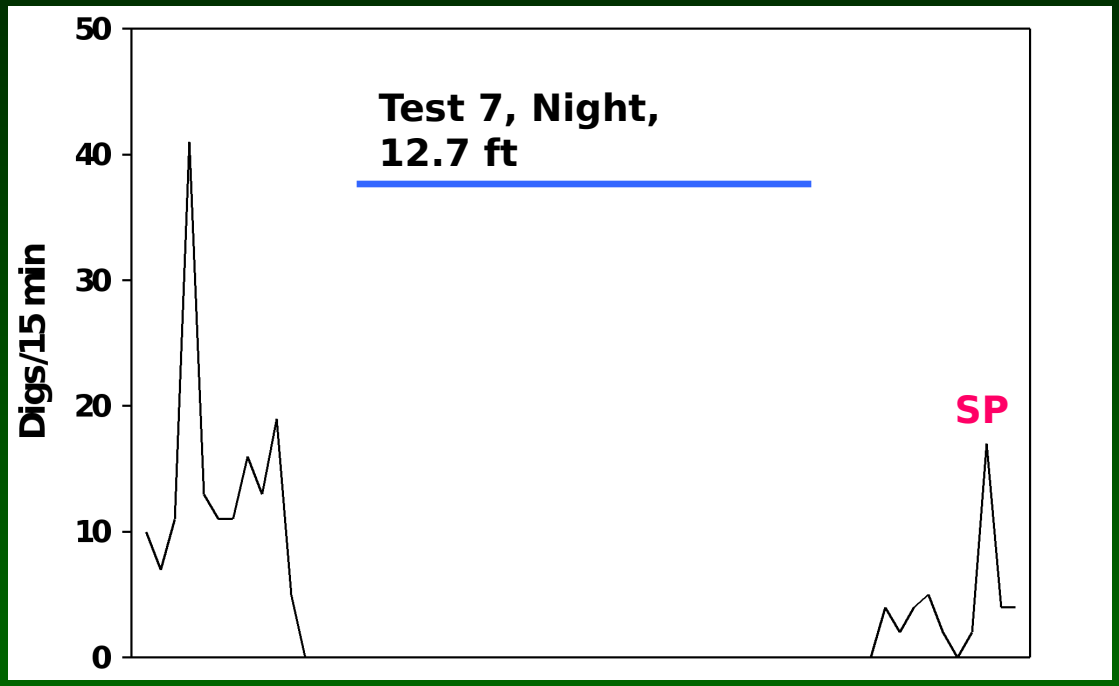

Test 2, Night, 14.5 ft
SP
Digs/15 min
60
50
40
30
20
10
0

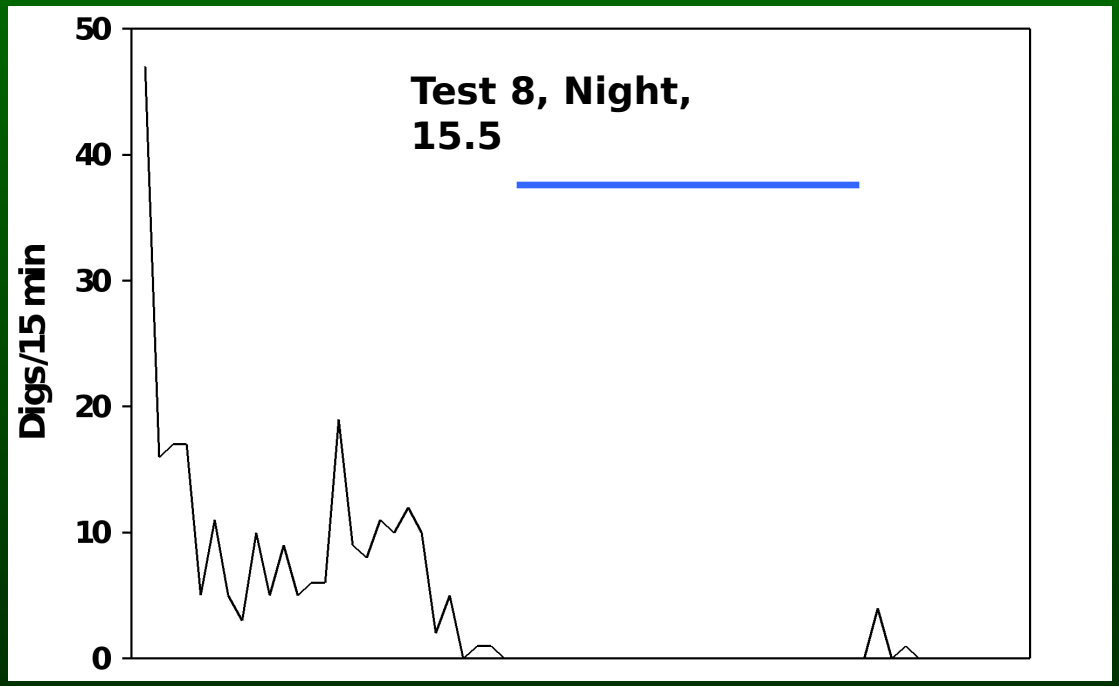
USGS


Test 3, Day,
13.0 ft
SP
Digs/15 min
40
30
20
10
0

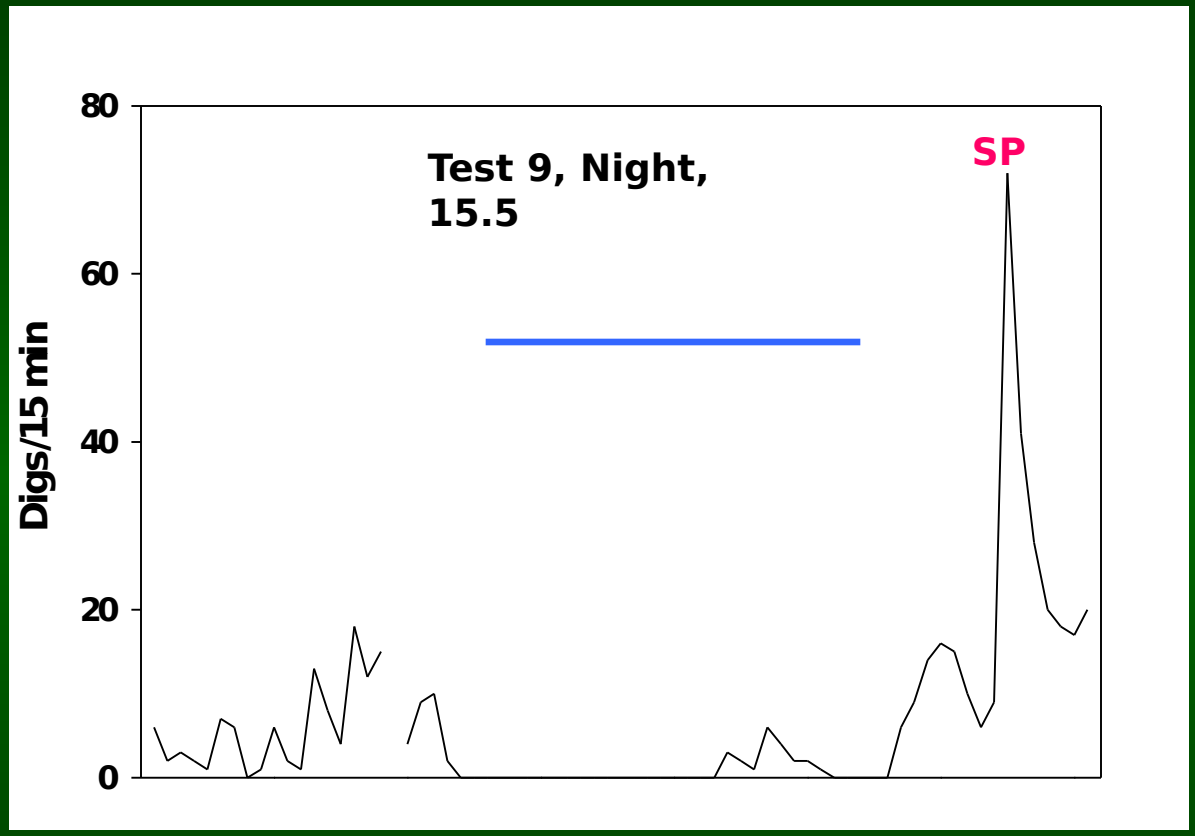

Test 6, Day,
15.5
Digs/15 min
20
15
10
5
0

USGS

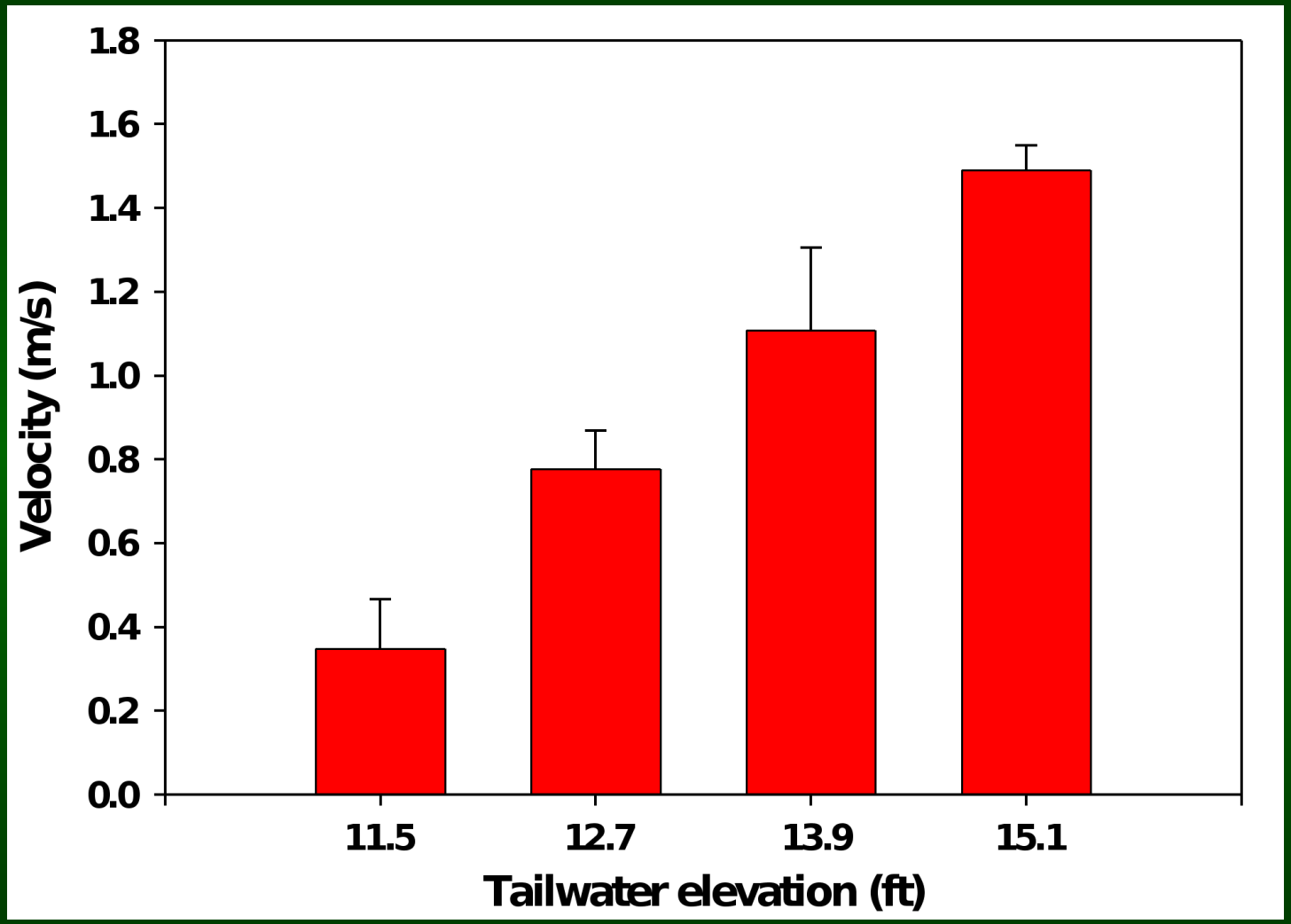

Test 7, Night,
12.7 ft
SP
Digs/15 min
50
40
30
20
10
0


Test 8, Night,
15.5
Digs/15 min
50
40
30
20
10
0

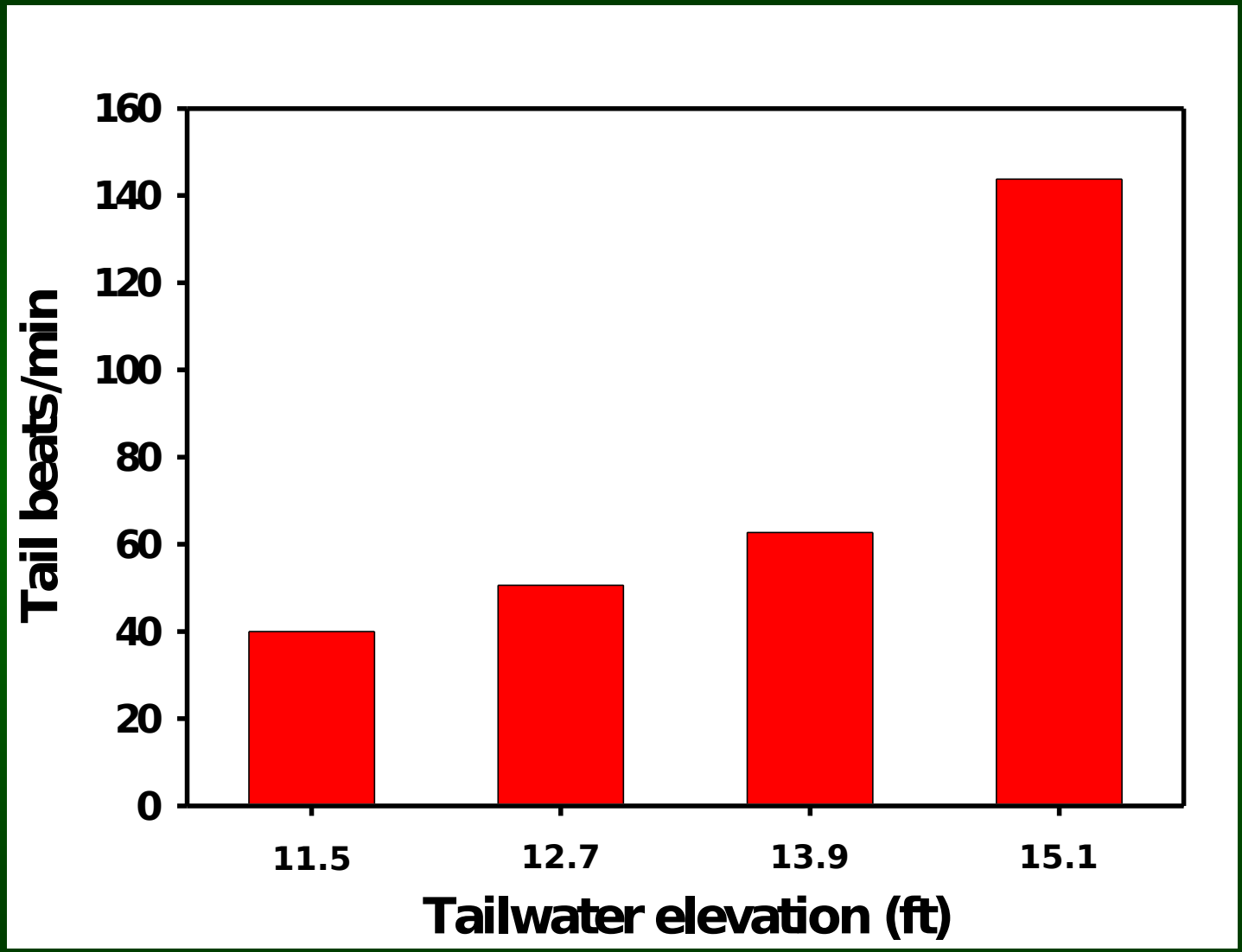
USGS



USGS


1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Velocity (m/s)
11.5
12.7
13.9
15.1
Tailwater elevation (ft)

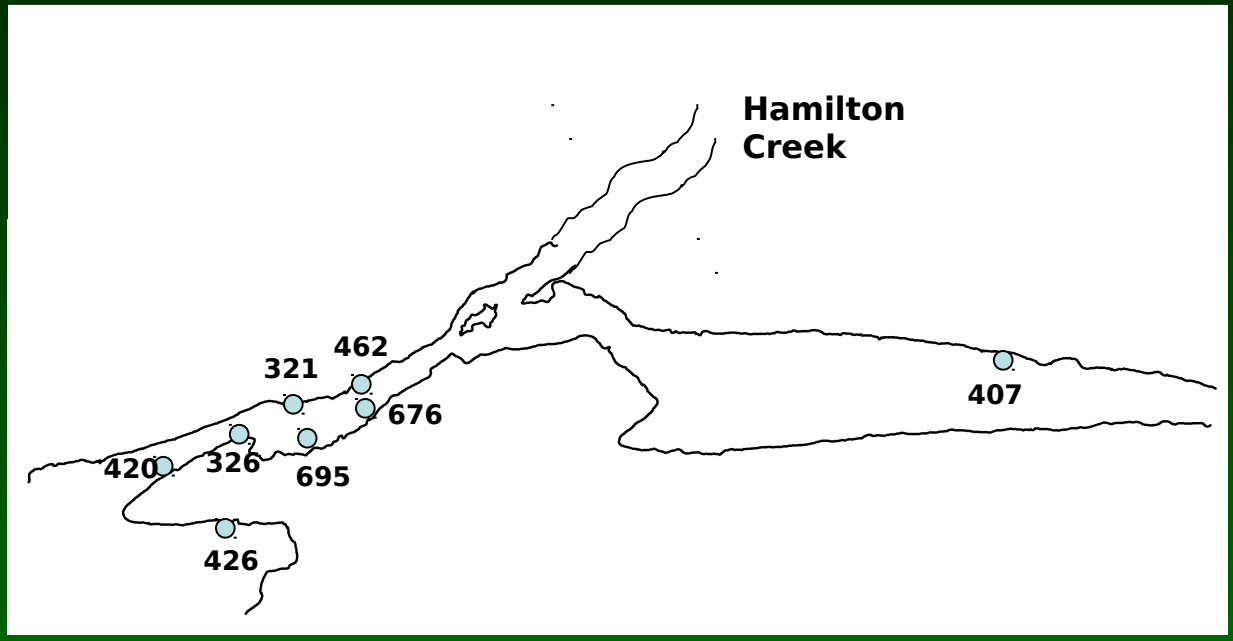
USGS

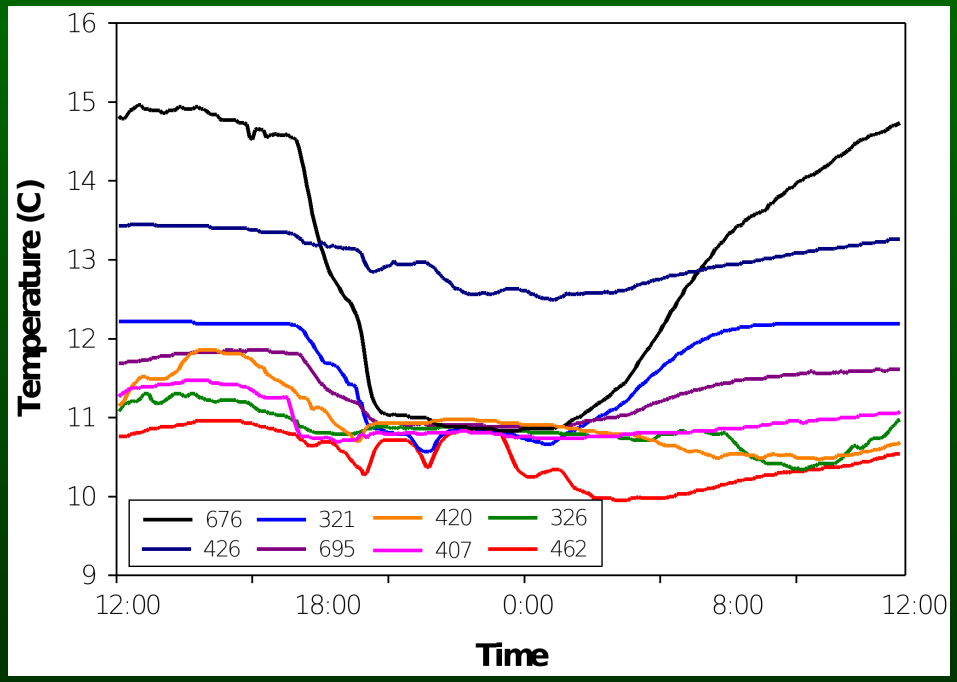

160
140
120
100
80
60
40
20
0
Tail beats/min
11.5
12.7
13.9
15.1
Tailwater elevation (ft)

USGS

o fish, spawning activity, or redds were found at highe riverbed elevations during flow tests in 2005, however, fish abundance was relatively low

USGS


Hamilton
Creek
462
321
676
407
420
326
695
426


16
15
14
13
12
11
10
9
Temperature (C)
12:00
18:00
0:00
8:00
12:00
Time
676
321
420
326
426
695
407
462

USGS

Conclusions:

1. Some fish were displaced from their redds at a tailwater el
of 15.5 ft.

2. Fish returned to their redds after flows returned to base le

3. Four of the eight pairs of chum salmon observed spawned
a flow test.

4. No redds were found at higher riverbed elevations, but fish
were down in 2005.

5. Some consequences of elevated flows we evaluated are sh
interruption in spawning activity, increased velocities and sw
activity, potential depression of thermal cues used for redd si
selection, and temperature variation experienced by incubati
and fry.

6. Analysis of acoustic telemetry data is ongoing.

USGS